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the sunshine and cooled by the radiation of heat; the upper layers of the atmosphere have both heat and moisture carried upward into them by convection, namely, by air that ascends from near the earth's surface: on the other hand the lower atmosphere is slightly cooled by the descent of an equivalent mass of the upper air. Of course radiation of heat from the atmosphere and the earth outwards goes on continuously, whereas convection is spasmodic; hence, the distribution of temperature is a regularity that is modified by many irregularities. The annual and the diurnal periods and the irregular variations of heat are appreciated by every one as is also its diminution with altitude. The barometric gradient is generally regarded as the cause of the motions of the atmosphere, but the rotation of the earth on its axis modifies these winds in such a way that northerly winds become northeast and southerly winds become southwest and so on around the circle. Of course the atmospheric pressure has its regular annual and diurnal variations and its irregular ones also, as well as its diminution with altitude. The regions of high pressure on the earth's surface are also regions of descending dry and dense air, whereas the regions of low pressure are those toward which the air is blowing and are the ordinary storm centers. The general circulation of the atmosphere is maintained by such barometric differences far above the earth's surface as well as at sea level: these are complicated with the large differences of the highs and lows of the barometric pressure that maintain our storm areas. The paths of these areas are shown by Milham in small maps prepared by several different persons—Bigelow, Van Cleef, Bebbler, Loomis, Russell. The attempt to predict the path of any area of high or low pressure is the fundamentally difficult problem of the forecaster and is one to which considerable attention is given in Professor Milham's book. The volume is illustrated by 157 illustrations and fifty charts and a number of numerical tables. A brief summary shows that Milham's meteorology is a work destined to be eminently useful, both to the teacher and to

the general reader. The publishers have spared neither money nor pains in order to make this beautiful volume acceptable to the author, the teacher and the student.

C. A.

*Probleme der physiologischen und pathologischen Chemie.* Fünfzig Vorlesungen über neuere Ergebnisse und Richtungslinien der Forschung für Studierende, Aerzte, Biologen und Chemiker, von Dr. OTTO von FÜRTH, A. Ö. Professor für angewandte medizinische Chemie an der Wiener Universität. I. Band, Gewebeschemie. Leipzig, Verlag von F. C. W. Vogel. 1912. Pp. xv + 634.

This is neither a systematic text-book, an encyclopædic compilation of facts, nor a mere epitome of current theories or methods—it is quite different from other recent publications in this field of science. Physiological chemistry has been the subject of an exceptionally large number of useful handbooks and comprehensive monographs on special topics, all published in very recent times and useful as works of reference. Here at length is a book which can not only be “tasted” or “swallowed,” but even “chewed and digested,” according to the Baconian classification. Assuming a familiarity with at least the elements of biochemistry on the part of every reader and making no pretense to cover the field with uniform completeness or comprehensiveness in every chapter, Professor v. Fürth has furnished a readable volume of refreshing novelty.

We are in danger, in present-day science, of becoming the slaves of system. These new lectures break away from some of the current tradition in respect to form and appeal to him who is not so much in search of organized literature as of inspiring viewpoints. The justification for this series of essays on the accomplishments and tendencies of the chemical physiology of these days—essays unhampered by the conventional text-book requirements—is well expressed by the author.

Ich vermag mich niemals eines Gefühles von Neid zu erwehren wenn ich zum Beispiel Briefe

von *Liebig*, *Wöhler* oder *Berzelius* lese und sehe, wie für diese Glücklichen jede wissenschaftliche Publikation ein Ereignis war. Mit welcher Liebe wurde alles, auch wenn es nur wissenschaftliche Kleinarbeit war, aufgenommen, mit welcher Freude wieder gelesen und überdacht. Wir laufen Gefahr, durch die Masse literarischer Produktion schliesslich das naive Vergnügen am Neuen einzubüssen und der Neugierde verlustig zu werden, die jedes ursprüngliche Individuum, ob jung oder alt, dem Unbekannten entgegenbringt und die schliesslich die Seele jeder echten Naturforschung ist. Und wenn heute in einem Fache, wie es die *Biochemie* ist, der Fachmann im Schweisse seines Angesichtes eben noch imstande ist, sich über die Literatur in ihren wichtigsten Erscheinungen einigermaßen zu orientieren, ist dies für den Fernerstehenden bereits längst ein Ding der Unmöglichkeit geworden.

The titles of the individual lectures are too diverse to be quoted here in detail. The treatment throughout is animated by the viewpoint of the physiologist, rather than the chemist. Chemistry is made to elucidate biological functions. The lectures can not fail to interest pathologist, therapist and surgeon as well as physiologist; for their problems are considered in common in a truly biological spirit well exemplified in a chapter on the thyroid. In a chapter on the kidneys, for example, the theories of secretion, the problems of uremia, the inadequate status of our knowledge of eclampsia, transplantation experiments, etc., are interwoven into suggestive relationships reminding one of how much still awaits solution. The critique of the author obviously can not always be equally forceful or correct; how trenchant it may at times become is illustrated by v. Fürth's comments in relation to eclampsia:

Für den Begriff eines "urotoxischen Koeffizienten," so schön und gelehrt dieser Name auch klingen mag, vermögen wir seinem Erfinder mit bestem Willen nicht dankbar zu sein.

It is unnecessary to proceed far in these lectures to discover that the author is something more than a compiler. He has studied physiological problems in the laboratory; and, as might be expected, the expert familiarity with certain phases of the subject betrays

itself advantageously in many places. For this reason, too, not all of the topics are treated with equal success. It is as gratifying as it is uncommon to find, in a European book, a thorough appreciation of the work of American investigators along physiological lines.

To one who enjoys the historical aspects of science the lectures will afford many entertaining reminders. There is a "subjective" tendency manifest throughout, which occasionally goes to the extreme of hyper-appreciation. The personal factor and individuality of the treatment crop out frequently in delightful "touches," a few of which may be quoted here. Speaking of the prolongation of life and the "sour milk" therapy of Metchnikoff:

Ist es doch das gute Recht der Menschheit, sich des grossen Allbezwingers mit allen ihr zugänglichen Mitteln zu erwehren, und es wäre sicherlich sehr erfreulich, wenn ein so einfaches Pharmakon, wie vergohrene Milch sich ihr als wirksames Kampfmittel erweisen sollte (p. 44).

For intermediary metabolism, we read, passt ein Bild, das einst ein geistvoller Mathematiker auf die Integralrechnung angewandt hat, um die unergründlichen Tiefen derselben seinen Hörern begreiflich zu machen. Er sagt, sie gleiche einem Meere, an dessen Ufern der Fischer immerhin das sammeln mag, was aus der Tiefe nach der Oberfläche dringt; doch vermag keines Menschen Auge die ganze Daseinsfülle zu ergründen, welche die abysssischen Tiefen erfüllt (p. 46).

Note the attitude toward exploded theories:

Es dürfte aber vermutlich noch eine ganze Weile dauern, bis die Uroleucinsäure aus der physiologischen Chemie verschwunden sein wird; denn die Biochemiker zeichnen sich meist durch eine besondere Pietät gegenüber den Irrtümern ihrer Vorgänger aus. In der "reinen" Chemie pflegt man kürzeren Prozess zu machen und hält es nicht für nötig, in jeder Abhandlung die ganze Kette überwundener Irrtümer früherer Generationen von neuem abzuhaspeln (p. 52),

or again:

Es ist stets eine missliche Sache, wenn man über unklare Dinge eine klare Auskunft geben soll (p. 67).

Commenting on the superiority of certain

synthetic over the older natural products, he writes:

Ich fürchte fast, es würde manchem Teilstücke der Herrlichkeit klassischen Altertums ebenso ergehen, wenn man es mit der Exaktheit einer chemischen Synthese vor unseren Augen neu erstehen lassen könnte. Von dem alten Märchenglanze würde vielleicht nicht allzuviel übrig bleiben (p. 76).

The future possibilities of protein synthesis are introduced with these words:

Sowohl für junge Menschen als auch für junge Wissenschaften gehören Ideale zu den notwendigen und gesunden Lebenselementen, da ihnen die Fähigkeit innewohnt, latente Kräfte zu mobilisieren und nützlichen Zielen dienstbar zu machen, wenn auch die Unerreichbarkeit streng genommen zum Begriffe eines Ideales mit dazu gehört (p. 96), whereas the older attempts are dismissed thus:

Dass wir auf diesem und auf ähnlichen Wegen zu wirklichem echten Eiweiss gelangen Könnten, ist wohl nicht viel wahrscheinlicher, als wenn jemand einen Haufen Lettern in einem Sacke durcheinander mischen, sodann auf den Tisch ausschütten und nun hoffen möchte, dass dieselben sich zu einem schönen Gedichte gruppieren würden (p. 97).

That there is no attempt to hide our ignorance in certain fields is indicated in connection with internal secretion,

ein viel missbrauchtes Schlagwort, welches im Laufe des letzten Dezenniums zu einer gewaltigen Popularität gelangt ist. Dasselbe bezieht sich auf die Funktion einiger Organe, deren physiologische Rolle und Bedeutung, ungeachtet eines grossen Aufwandes von Mühe und Arbeit, in tiefes Dunkel gehüllt ist. "Denn eben wo Begriffe fehlen, da stellt ein Wort zur rechten Zeit sich ein;"—so sprach einmal ein weiser Mann, der zwar von "inneren Sekretionen" noch nichts ahnte, dafür aber über manche andere Dinge um so besser Bescheid wusste (p. 404).

The sources of the literature are indicated in a comprehensive way and the progress of research has evidently been followed up to very recent months. There is, as a rule, no irritating wealth of details; yet the essential steps in important reactions, such as the synthesis of suprarenin, are reviewed with painstaking accuracy. A second volume on metabolism is promised soon.

The publication of the lectures was the outcome, the author tells us, of a desire

meine eigene Freude an biochemischem Suchen und Erkennen anderen, die danach Verlangen tragen, zu übermitteln und auf diesem Wege meiner Wissenschaft zu dienen.

In this Professor v. Fürth has succeeded.

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*The Lower Cretaceous Deposits of Maryland.*

By WILLIAM BULLOCK CLARK, ARTHUR B. BIBBINS, EDWARD W. BERRY and RICHARD S. LULL. Maryland Geological Survey. 1911. Pp. 1-622, pl. I-XCVII.

This volume, the fourth of a series of exhaustive reports dealing with the systematic geology and paleontology of Maryland, is devoted to the Lower Cretaceous and is a distinct and invaluable contribution to the history of the Atlantic coastal plain geology of which the Maryland section may be taken as the type. The first hundred pages are devoted to the coastal plain region of the state and comprise a description of its physiographic features and a briefer statement of the Cretaceous, Tertiary and Quaternary formations, followed by a more detailed account of the areal distribution, lithologic character, stratigraphic and structural relations and organic remains of the three Lower Cretaceous formations involved. These, according to the nomenclature adopted, are, in the order of their superposition, the Patuxent, the Arundel and the Patapsco formations, together comprising the Potomac group. An especially valuable part of this portion of the volume is the historical review of opinion and the bibliography, for, be it known, the geology of Maryland has been the subject of much discussion and difference of interpretation. For example, the Patuxent and Arundel formations, on the basis of their contained vertebrates, were held by Marsh to be of Jurassic age, while the abundant plant-remains argued indisputably for their Lower Cretaceous age, a conclusion to which Professor Lull, who has reexamined the vertebrate material, has also come.